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ABSTRACT

First-year evaluation of the Word Attack Component of the Wisconsin Design for Reading was conducted in 23 elementary schools representing disadvantaged inner-city and advantaged schools in Wisconsin and Colorado. Primary-grade pupils in each of the schools experienced the program for 6 months, during which instruction was followed by criterion-referenced tests to indicate individual pupil mastery of skills. Subjects in all schools who had not experienced the program were tested in May, 1970, using the Wisconsin Tests of Reading Skill Development--Word Attack and three standardized reading tests. Subjects who had experienced the program were given the same tests in May, 1971. Simple t-tests and complex variations of t-tests were used to analyze the data. Subjects who had participated in the program achieved significantly higher scores on the standardized tests of reading, vocabulary, and comprehension, and on tests associated with the specific program objectives. The results of the first-year field testing and evaluation of the Word Attack Component were judged to be encouraging. References are included. (MS)

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IMPLEMENTATION AND FIELD TESTING OF THE DESIGN*

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The formal field test of the Word Attack began during the 1970-71 school year and is continuing during the 1971-72 school year. The Study Skills and Comprehension components will be field tested at a later time and will not be reported in this paper.

*This is the fifth paper in a symposium -- A Skill Centered Approach to Reading Instruction: The Wisconsin Design for Reading Skill Development -- at the 1971 annual meeting of the National Reading Conference, Tampa, Florida.

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The Word Attack component of the Design is presently being field tested at the primary levels in eighteen Wisconsin and five Colorado elementary schools. Five of the eighteen Wisconsin schools are located in the central-city portion of Milwaukee. These sites are referred to as disadvantaged since median reading achievement is a year or more below grade level. The remaining Wisconsin and Colorado sites are referred to as advantaged schools. This paper will report on the performance of pupils in these schools who had experienced the program for approximately six months.

Objectives for the Word Attack Component

Three major objectives have been stated for the Word Attack component:

Terminal Objective

The student upon attainment of all Level D Skills will be able to attack independently, phonically and/or structurally regular words and will recognize on sight all the words on the Dolch list. Children of average or above average ability will attain this objective at least by the end of the fifth year (fourth grade) in school, while others will attain this objective by the end of the seventh year.

Interim Objective

The student upon attainment of all Level C Skills will be able to attack independently, phonically regular one syllable words and their structural variants, and will recognize on sight the easier 110 words on the Dolch list. Children of average or above average ability will attain this objective by the end of the fourth year in school, while others will attain this objective by the end of the fifth year in school.

Specific Objectives

Forty-five specific behavioral objectives have been stated elsewhere (Otto and Askov, 1970). The student whose pupil record indicates he has attained a particular skill will perform at a mastery level (80% or higher) on a subsequently administered criterion-referenced test.

Objectives of the Evaluation

Three additional objectives have been stated for the evaluation of the overall program. These objectives are:

(a) to determine whether the terminal, interim, and specific objectives of the program are met. (Attainment of terminal and interim objectives is meaningfully assessed only in the second year of program operation and thereafter.)

(b) to determine whether the Word Attack and other reading skills of children using the program are greater than those of children not using the program in the same schools and at the same age-grade levels in the year prior.

(c) to learn how the program is implemented in a variety of selected sites in which leaders are not exposed to a standard training program and how local variants affect program success.

Preliminary data related to the attainment of the Word Attack terminal and interim objectives are presently being gathered and therefore will not be reported in this paper. Subjects in the field test are presently engaged in mastering the forty-five specific behavioral objectives.

At this point in time, it is perhaps more crucial to examine the objectives of the evaluation. As specified earlier, attainment of the program objectives is assessed meaningfully only in the second year of program operation and thereafter. The latter two evaluation objectives, performance of students who were involved in the program versus those who were not and program implementation practices, are the primary foci of this paper.

Design of the Study

During May, 1970, randomly selected subjects in the twenty-three field tests schools who had not experienced the program were administered selected batteries of the Wisconsin Tests of Reading Skill Development - Word Attack as well as three standardized reading tests. The standardized reading tests were the Cooperative Primary Tests, Word Analysis (1965); the Stanford Achievement Test, PI and PII (Kelly, et. al., 1964); and the Comprehensive Tests of Basic Skills, Vocabulary and Comprehension (1968). To facilitate the testing, students were randomly assigned to sittings and ordinarily participated in only one test sitting. The tests which comprise each sitting are found in Appendix A. During May, 1971, another random sample of students was selected and participated in the interim testing program.

While the unit of reference is the individual student, the unit for statistical analysis must be the entire grade cohort. This is necessary since the presence or absence of the program is experienced for all or none of the

cohort and the effects of the particular conditions of implementation are experienced by the entire participating school staff.

To determine whether a change in performance between the control group (subjects not exposed to the program) and the experimental group (subjects exposed to the program) can be inferred, the data were used to test the null hypothesis that no change had occurred. Hypotheses concerning change at each grade level, and within grade level, by type of measure, were tested separately. In other words, for a given grade level, up to three hypotheses related to no change on program-dependent Design subtests, program-independent Word Attack tests, and standardized measures of general reading ability were tested. In each case, the data consisted of one or more change scores for each school in the field test. Each change score represented the difference between the mean scores for the first implementation year and the preimplementation year for a given measure or set of measures. (Composite scores were formed for the three to five Design subtests administered in a single setting.)

In those cases for which there is but one change score per school for a particular grade and content type, a two-tailed t-test was used to determine whether the hypothesis of no change should be rejected or not rejected. If the hypothesis is rejected, and if the change is positive, a gain was inferred; if significantly negative, a loss was inferred.

A more complex analysis was performed when two or more change scores were available from each school. The three-step analysis first required re-scaling of the change scores to take into account scale difference between measures (or their composites) and to give more weight to the more reliable measures. Each raw change score was multiplied by a constant inversely proportional to the standard deviation of the schools' change scores.

Next, it was determined whether the amount and direction of change varied by measure, as rescaled. The expectation was that change would be consistent for the various measures of a given kind. To test the hypothesis, contrasts between changes in the various measures were firmed, and a t-ratio or Hotelling's T^2 statistic computed. Rejection of the hypothesis indicated that degree and direction of change was systematically different for the instruments, whereas from failure to reject supported the assumption of consistency in change.

Depending upon the outcome of the test of the consistency hypothesis, the last step varied. If consistency was inferred from step two in the analysis, then a T^2 test is applied to the average change score across measures to determine whether the raw unit change is nonzero. Descriptive statistics indicate the direction and amount of change. If change is not consistent across measures, the change scores for all measures are analyzed by Hotelling's T^2 test to determine whether a change occurred. If this test yields significant results, univariate tests are subsequently used to identify the measures in which there was change.

Program implementation practices, the third evaluation objective, were ascertained by randomly selecting a sample of teachers and mailing them questionnaires.

Findings

The most marked effects of the program was related to tests associated with the specific program objectives. Achievement of subjects enrolled in the program compared to those not enrolled favored the former group on more than

ninety percent of the objectives. This finding pertained to both advantaged and disadvantaged schools.

Insert Table 1 About Here

In addition, performance on the standardized reading test was as good or better for participating pupils. Mean gains of six, nine, and thirteen raw score points in some inner-city schools on the Cooperative Primary Test - Phonics Analysis were observed. Increases for other tests were more modest.

Performance on vocabulary and comprehension measures of reading achievement were slightly negative for the former and negligible for the latter. These results may be attributable to a conversion from a general word recognition teaching technique to a phonic approach and emphasis on word attack skills rather than on comprehension. Increased scores on both vocabulary and comprehension are anticipated as the field testing continues.

Analysis of returned teacher questions revealed that about sixty percent of the teachers are responsible for instructing a single skill group, thirty percent for two groups, and ten percent for three groups. Approximately nine percent of the children in a skill group were excused before the last day because they had demonstrated skill mastery. Interestingly, twenty percent of the children in a skill group receive different instruction even though all children in a skill group demonstrate a common need. This indicates that individualization of instruction is occurring within the skill group.

Most students demonstrate skill mastery by performance on a paper-and-pencil test; only ten percent of the students are assessed strictly by teacher

TABLE 1

SUMMARY OF SIGNIFICANT RESULTS FOR

FIRST YEAR WORD ATTACK FIELD TEST

	Disadvantaged		Advantaged	
Grade	WTRSD	Stand.	WTRSD	Stand.
1	<.05	None	<.01	<.05[d]
2	<.01	<.05[a]	<.01	N.S.[e]
3	N.S.	N.S.[b]	<.01	<.01(neg.)[c]
4	N.S.	N.S.[c]	None	None

[a]Cooperative Primary Tests - Word Analysis

[b]Cooperative Primary Tests - Word Analysis
Stanford Achievement Tests - Word Meaning and Word Study Skills

[c]Comprehensive Tests of Basic Skills - Vocabulary and Comprehension

[d]Cooperative Primary Tests - Word Analysis
Stanford Achievement Tests, PI - Word Reading and Word Study Skills

[e]Stanford Achievement Tests, PII - Word Study Skills and Word Meaning

judgment. The majority of teachers administer tests themselves while two-thirds of the teachers perform their own scoring of tests.

The first-year field test of the Word Attack component has been completed while the second-year of the Word Attack and first-year of the Study Skills components has only begun. The Design, then, is in the first phase of an extensive field testing program. Additional field test results will be reported at professional meetings as well as through the Research and Development Center for Cognitive Learning publications (Quilling and Otto, 1971, in press).

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APPENDIX A

Part 1

Schedule of Sittings Where Present Reading Achievement is at or Above Grade Level

Grade	Sitting	Test	Administration Time (In Minutes)
1	1	Cooperative Primary Tests Word Analysis	40
1	2	Stanford Achievement PI Word Reading Word Study Skills	 15 25
1	3	Wisconsin Tests of Reading Skill Development - Level B Test 3 - Beginning Consonant Sounds Test 5 - Consonant Blends Test 6 - Rhyming Elements	 10 10 10
1	4	Wisconsin Tests of Reading Skill Development - Level B Test 7 - Short Vowels Test 10 - Contractions Test 11 - Base Words and Endings	 10 10 10
2	1	Stanford Achievement PII Word Study Skills Word Meaning	 30 12
2	2	Wisconsin Tests of Reading Skill Development - Level C Test 3 - Consonant Blends Test 4 - Long Vowel Sounds Test 12 - Consonant Digraphs	 10 10 10

Part 1, Cont.

Grade	Sitting	Test	Administration Time (In Minutes)
2	3	Wisconsin Tests of Reading Skill Development - Level C	
		Test 5 - Vowel + r, a + l, a + w	10
		Test 6 - Diphthongs	10
		Test 16 - Synonyms and Antonyms	10
2	4	Wisconsin Tests of Reading Skill Development - Level D	
		Test 2 - Three Letter Consonant Blends	10
3	1	Comprehensive Tests of Basic Skills	
		Vocabulary	15
		Comprehension	34
3	2	Wisconsin Tests of Reading Skill Development - Level D	
		Test 2 - Three Letter Consonant Blends	10
		Test 3 - Silent Letters	10
		Test 4 - Syllabication	10
		Test 5 - Accent	10
		Test 7 - Possessives	10

Part 2

Schedule of Sittings Where Present Reading Achievement
Is Below Grade Level, 1970

Grade	Sitting	Test	Administration Time (In Minutes)
1	1	Wisconsin Tests of Reading Skill Development - Level A	
		Test 1 - Rhyming Words	20
		Test 5 - Words and Phrases	15
		Test 7 - Initial Consonants	15
1	2	Wisconsin Tests of Reading Skill Development - Level B	
		Test 3 - Beginning Consonant Sounds	10
		Test 5 - Consonant Blends	10
		Test 6 - Rhyming Elements	10
1	3	Wisconsin Tests of Reading Skill Development - Level B	
		Test 8 - Consonant Digraphs - sh, ch, th	10
		Test 9 - Compound Words	10
		Test 12 - Plurals	5
2	1	Cooperative Primary Tests	
		Word Analysis	40
2	2	Wisconsin Tests of Reading Skill Development - Level B	
		Test 3 - Beginning Consonant Sounds	10
		Test 5 - Consonant Blends	10
		Test 6 - Rhyming Elements	10
2	3	Wisconsin Tests of Reading Skill Development - Level B	
		Test 7 - Short Vowels	10
		Test 10 - Contractions	10
		Test 11 - Base Words and Endings	10

Part 2, Cont.

Grade	Sitting	Test	Administration Time (In Minutes)
2	4	Wisconsin Tests of Reading Skill Development - Level C	
		Test 3 - Consonant Blends	10
		Test 4 - Long Vowel Sounds	10
		Test 12 - Consonant Digraphs	10
3	1	Cooperative Primary Tests	
		Word Analysis	40
3	2	Stanford Achievement Tests	
		Word Meaning	12
		Word Study Skills	30
3	3	Wisconsin Tests of Reading Skill Development - Level C	
		Test 3 - Consonant Blends	10
		Test 4 - Long Vowel Sounds	10
		Test 12 - Consonant Digraphs	10
3	4	Wisconsin Tests of Reading Skill Development - Level C	
		Test 5 - Vowel + r, a + l, a + w	10
		Test 6 - Diphthongs	10
		(D) Test 2 - Three Letter Consonant Blends	10
4	1	Comprehensive Tests of Basic Skills	
		Vocabulary	15
		Comprehension	34
4	2	Wisconsin Tests of Reading Skill Development - Level C	
		Test 5 - Vowel + r, a + l, a + w	10
		Test 6 - Diphthongs	10
		Test 16 - Synonyms and antonyms	10
		(D) Test 2 - Three Letter Consonant Blends	10

Part 2, Cont.

Grade	Sitting	Test	Administration Time (In Minutes)
4	3	Wisconsin Tests of Reading Skill Development - Level D	
		Test 3 - Silent Letters	10
		Test 4 - Syllabication	10
		Test 5 - Accent	10
		Test 7 - Possessives	10